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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •

DECEMBER 28, 1935

Wandering Players

See Page 409

A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

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The Weekly Summary of Current Science

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SCIENCE SERVICE

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Edited by WATSON DAVIS

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DO YOU KNOW?

Suicide is twice as frequent among white persons as among Negroes.

Crossbows are still ordinary weapons among some of China's native tribes.

Feeding fresh cut sugarcane to cattle is being tried experimentally in Florida.

There are only 70 pure breed European bison living today, of which 21 are in Poland.

There are 3,500,000 deaths from malaria every year, the majority occurring in the British Empire.

Tropical medicine is traced to a start in 1600, when the East India Company carried doctors to the tropics.

Massachusetts is spending four million dollars to lay sidewalks for pedestrian safety along inter-urban highways.

A quiet violin lacking a soundbox is played softly by one well-known radio performer when he practises late at night.

In Berlin, a motorist who establishes a record as a dangerous driver is given a yellow cross mark on the windshield of his car.

So that blind people may read it, one of Cornell University's bulletins—*Poultry Keeping for Junior Poultrymen*—is to be printed in raised Braille type.

Ragweed may be a pest to hay fever victims, but it is valuable to tobacco growers: if planted in rotation, it is followed by tobacco of better quality and quantity.

There are estimated to be 5,000,000 blind people in the world.

Ancient Egyptians believed that Egypt was the center of the universe.

Cotton and linen textiles are stronger when wet, but rayon is stronger when it is dry.

It is estimated that for every ten men making steel, five more are kept at work supplying them with raw materials.

Digging at Athens reveals that the famous Agora, the market place, had been used as a cemetery as early as 3000 B.C.

Spiders apparently can distinguish between the taste of pure water, sugar solution, and brine, it is found from experiments.

To fight the Dutch elm disease that menaces America's elm trees, 3,000 men are at work on a program costing $2,500,000.

The American Museum of Natural History in New York has in its collections some tropical roaches that are three inches long and are very fond of spinach.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the article.

ANTHROPOLOGY

What makes scientists think that Peking Man was a cannibal? p. 404.

ARCHAEOLOGY

Is drinking at games something new? p. 410.

ASTRONOMY

How can a spherical telescope mirror be made paraboloid? p. 411.

What important astronomical event will occur in 1936? p. 406.

CHEMISTRY

How do high pressures aid the chemist in industry? p. 410.

GENERAL SCIENCE

Can scientists predict how well an unborn horse can run? p. 403.

Has much machinery been introduced into industry in recent years? p. 408.

MEDICINE

What disease makes students go to sleep in class? p. 403.

PHYSICS

How many elements can now be made artificially radioactive? p. 408.

What is the neutrino? p. 410.

PHYSIOLOGY

What new function has been found for blood serum? p. 410.

PLANT PHYSIOLOGY

When sensitive plants are dosed with carbon monoxide, what happens? p. 405.

PSYCHOLOGY

Why does Eriksson's name appear on a rock on Noman's Land? p. 409.

ZOOLOGY

Can a beaver "hold" his heart as well as his breath? p. 407.

A VERY SMALL SPECIMEN

The Carnegie Institution's annual exhibit in Washington this winter was enlivened with a few bits of actual desert, transported East for the purpose. There were potted specimens of things one ordinarily only reads about: palo verde, ocotillo, agave, and a "very small" giant cactus of the genus Carnegia. When full size, this strange vegetable is of tree height, and dominates the landscape where it grows. Dr. Forrest Shreve, in charge of the Desert Laboratory at Tucson, is shown "yardsticking" for this specimen.

MEDICINE

Find Drug That Will Keep Sleepy Persons Wide Awake

Students Who Sleep in Class But Cannot Blame Professor Relieved by Drug that Also Aids Cataplexy

A DRUG to keep sleepy persons awake is now being used in medical treatment with pronounced success.

First report on the use of benzedrine for the treatment of what the doctors call narcolepsy, or sleep attacks, is made by Dr. Myron Prinzmetal of Los Angeles and Dr. Wilfred Bloomberg of Boston. (*Journal, American Medical Association,* Dec. 21)

Students especially are given to sleep attacks, and for these their own central nervous systems rather than their professors are to blame.

Nine cases of persons who fell asleep at least three times a day are reported by the physicians, whose work with benzedrine has been done in connection with the neurological service of Boston City hospital and Harvard Medical School. In each of the nine cases relief was complete when suitable doses were given. The drug also gives practically complete relief of cataplexy, a state of muscular rigidity produced by sudden emotion, shock or fear.

The studies made show benzedrine to be three times as effective in preventing attacks of sleep as ephedrine, the treatment usually given.

Seven of the cases reported were among students; the other two affected were a housewife and an office worker.

Three of the students suffered from momentary generalized weakness whenever they laughed. One girl had to give up college because she couldn't avoid falling asleep in classes.

An eleven-year-old school boy slept all the time he was not actively occupied, and consequently failed in his school work. One sleepy young man had been injured in a football game, after which he became more and more drowsy until he had six sleep attacks every day.

The two physicians state that benzedrine has a profound stimulating action on the higher centers of the central nervous system. It has been used in hayfever and asthma.

Science News Letter, December 28, 1935

GENERAL SCIENCE

Formula for Racing Shown At Carnegie's Exhibit

A FORMULA for the racing capacity of a Thoroughbred horse yet unborn . . . pieces shot out from the sea's bottom a mile and a third down . . . a new link in the early life of the monkey . . . evidence that man lived in America 10,000 B.C. . . . warning that silt is still a problem at Boulder Dam . . . pressures of 180,000 pounds per square inch.

These and other new developments in a score of scientific fields were reported to the Board of Trustees of the Carnegie Institution of Washington at an exhibition demonstrating high points in the Institution's work.

Mathematical estimates of the racing capacities of Thoroughbred colts yet unborn have been worked out by Dr. Harry H. Laughlin of the Institution's Eugenics Record Office at Cold Spring Harbor, N. Y. Dr. Laughlin's formulae take into account past performances of all notable racehorses in any given animal pedigree, and although they definitely cannot be used for setting the odds in any particular race, they will give the owner an idea of what he can expect of his foal in the long run. Dr. Laughlin has even worked out an ideal "synthetic" horse, which has not yet been realized in the flesh, although it has been possible to approach him, given proper breeding opportunities.

Samples of seabottom rocks can be obtained by a kind of short cannon that is lowered on a cable, to fire a hollow projectile against the floor with a charge of powder. The hollow shell punches out a piece of the bottom just as a watermelon "plugger" takes a sample of the melon. The solid sample can then be hauled to the surface for study and preservation. In the development of this apparatus, the Geophysical Laboratory of the Carnegie Institution and the Geological Society of America worked in cooperation, with assistance also from the du Pont Powder Company and the U. S. Lighthouse Service. (*Turn Page*)

From the Institution's laboratories of embryology in Baltimore comes a stage in the development of the monkey that has never been seen before. It is the living organism at the point where it is simply a hollow ball of cells filled with fluid, resulting from the original fertilized egg. At the stage shown, it is just ready to become attached to the maternal tissues, to begin its slow development leading to birth.

Folsom Man, whom archaeologists recognize as the earliest known American, but whom they have perforce left vaguely "in the air" as to date, is at last restored to a time in American prehistory. Edgar B. Howard who has made studies at Clovis, New Mexico, exhibited evidence that Folsom Man was present in America about 10,000 B.C. This is the age assigned on geological evidence to a lake bed at Clovis where some of Folsom Man's distinctive grooved stone spear-points were lost.

Mr. Howard also reports that America's oldest hunters, these Folsom Men, used unique stone weapons. Their grooved darts, thin and leaf-shaped, are not matched by any Stone Age weapons found elsewhere in the world.

Electrical tides in the earth—great surges of electric current intimately tied up with the Northern Lights and magnetic disturbances—were demonstrated in a working exhibit by the Institution's Department of Terrestrial Magnetism. The earth currents affect compass needles and telegraph communication; the latter, in fact, was the means of discovering the currents in 1844.

Experimental studies in the Geophysical Laboratory on the actions of solutions under pressures as high as 180,000 pounds to the square inch, are disclosing new facts on such different things as the air man breathes, the human blood, beverages of all kinds, oil, gasoline, glass and the lavas flowing from volcanoes. All these are solutions having common broad problems.

Science News Letter, December 28, 1935

ANTHROPOLOGY

Peking Man Possibly Cannibal, Bone Examination Indicates

CANNIBALISM may have been a part of the regular life of Peking Man, recently discovered but already famous pre-Neandertal race of ancient China.

Indications to this effect have been uncovered by studies of Dr. Franz Weidenreich, who was professor of anthropology at the University of Frankfurt, Germany, in pre-Nazi days. Later he was at Chicago University, and is now conducting his researches at Peking Union Medical College, Peiping, China, as successor to the late Dr. Davidson Black, who first gave to the world detailed information about these oldest known human inhabitants of China.

The most recent issue of the *Bulletin of the Geological Society of China* contains a report by Dr. Weidenreich, stating that an exhaustive examination of a mass of bones and teeth found in Peking Man's first known home, the Chou Kou Tien caves, sorts them out as having belonged to 24 individuals. The count includes two children aged about five years, six about seven to ten years old, and four individuals between eleven and eighteen years.

The crushed condition of the skulls, and the absence of all body bones, of both children and adults, suggests that not only might Peking Man have been a cannibal, but that he had an active preference for children. Since there is as yet no evidence of the existence of any other human race in China at the time of Peking Man, the inference is natural that he preyed upon his own kind.

Interviewed by Science Service, the noted English anthropologist Elliot Smith stated:

"It is quite possible that Peking Man was a direct forerunner of the Neandertal race, as Dr. Weidenreich suggests. There is nothing anywhere comparable with this numerous collection of individuals of such an early race. Piltdown Man of England and Trinil Man of Java are represented only by remains of single individuals. It is always a great problem to determine how far characteristics of any one individual can be taken as representing those of an entire race.

"This report should help to restore confidence in the work of anthropologists. From one tooth, Dr. Davidson Black postulated a new race. His conclusion was supported by the discovery of the original Peking skull and by the subsequent finding of other remains. Now this fuller report of a larger number of individuals bears out the main concepts of our picture of Peking Man."

Science News Letter, December 28, 1935

SEISMOLOGY

Earthquakes in Pacific And South America

TWO EARTHQUAKES only ten hours apart shook widely separated spots on the bottom of the Pacific Ocean on Dec. 14 and 15. One was about 70 miles off the coast of Guatemala, the other in the neighborhood of the Solomon Islands. Locations of the epicenters were made by seismologists of the U. S. Coast and Geodetic Survey and of the Jesuit Seismological Association, St. Louis, on the basis of information transmitted through Science Service from a number of observatories in the United States and the Philippine Islands.

The Guatemalan quake began at 5:05.4 p. m., Eastern Standard Time, on Dec. 14; its epicenter was in approximately 14 degrees north latitude, 93 degrees west longitude. The Solomon Island quake started at 2:07.8 a. m., Eastern Standard Time, and was located in about 12 degrees south latitude, 161 degrees east longitude. It was rated as a strong shock.

Observatories reporting to Science Service were those of Pennslyvania State College, the University of Wisconsin, the University of Virginia, the Philippine Observatory at Manila, Georgetown University, St. Louis University, Canisius College at Buffalo, and the stations of the U. S. Coast and Geodetic Survey at Tucson, Ariz., and Honolulu.

"Back of the Andes"

Destruction may have come by earthquake, to villages on the "back of the Andes" near the Peru-Brazil boundary, on Friday, the thirteenth. But if the quake did bring ruin with it, the world will probably not have direct word for days or weeks, because of poor means of communication with that isolated part of the world.

The earthquake sent its own message, via tiny tremors through the solid earth, to half-a-dozen seismological observatories in this country. Their data, relayed by Science Service to the Jesuit Seismological Association in St. Louis and to the U. S. Coast and Geodetic

Survey, Washington, D. C., have been interpreted and a preliminary "fix" given to the epicenter, or point of greatest disturbance.

This is calculated as having been in latitude 6 degrees south, longitude 74 degrees west. It was a "deep-focus" quake, with the rock-slip that caused it occurring 350 kilometers (about 200 miles) beneath the earth's surface. Time of origin was 8:31.3 p. m., Eastern Standard Time, on Friday, Dec. 13.

This earthquake was recorded on instruments at the University of California, Berkeley; the University of Wisconsin, Madison; Canisius College, Buffalo; Georgetown University, Washington, D. C.; St. Louis University, and the observatory of the U. S. Coast and Geodetic Survey at Tucson, Arizona.

Several years ago, a severe earthquake "back of the Andes," that caused considerable damage and loss of life, reported itself through the seismographs a full three weeks before messengers on foot managed to struggle through the tumbled mountain ways and bring the news to the nearest telegraph station.

Science News Letter, December 28, 1935

PLANT PHYSIOLOGY

Movies Show Plants Dancing, Getting Dazed on Monoxide

Reverse of Slow Motion Speeds Movements of Plants To Make Visible Their Rhythmic "Dance of Life"

PLANTS moving with rhythmic grace as though in an esthetic dance, plants getting "blind drunk" on a whiff of poisonous carbon monoxide, featured a botanical movie show put on at a meeting of the New York Academy of Sciences, by Dr. William Crocker, of the Boyce Thompson Institute for Plant Research, Yonkers, N. Y.

In the "Dance of Life" pictures, the plants, being rooted, perforce emulated some of the modernist human dancers, who "move everything but the feet." They swayed and undulated from side to side, slowly raised their leaves in unison, like arms, and slowly lowered them again. Tips of twining plants circled like the heads of snakes. Roots "wormed" through the earth.

It was all done by the opposite of the process used in making slow-motion movies. In taking slow-motion pictures, the camera is run at greatly increased speed while taking, and the finished films projected at ordinary speed, thereby greatly slowing down the apparent rate of motion. In the films shown by Dr. Crocker, the "time-lapse" process was used. In this, the camera is set up in front of the plant and the motor-operated shutter is set for exposures at intervals of several minutes, hours or even days. In this way the plant's motions, imperceptible to the eye, are "condensed," and become evident when the film is projected at normal speed. The hundred days of a corn plant's life can be packed into five minutes of projection.

The graceful, sinuous "dance" of a growing plant is due to the fact that not all its cells expand at the same rate. Consequently, one side of the stem, or leaf, or other organ is always growing a little faster than the other, and pushes the tip in the opposite direction. Then the other side grows faster for a while, and the plant sways the other way.

Plants were shown getting intoxicated on two different gases, ethylene and carbon monoxide. The first gas, which has been much used for producing ripe color on fruits, stimulating seeds and cuttings to grow etc., affects plants in very low concentrations. When used as a mixture of one part in a half-million of air, its first effect was stimulating. The growing tissues on the upper sides of tomato and sunflower leaf-stems grew faster, causing the leaves to turn downward. The youngest leaves were most sensitive, but soon the mature leaves "noticed" it also. Restored to clean air, the plants recovered and the leaves returned to position, though the older ones could not quite get back to normal.

Mimosas, or sensitive plants which can fold down their leaves when touched or otherwise stimulated, were so affected by carbon monoxide that they would not react, even to heat. They were like intoxicated persons who can be burned without noticing it. Yet their recovery by the morning after was complete, with no noticeable hangover.

Science News Letter, December 28, 1935

DIZZY FROM GAS

Just a mild dose of carbon monoxide (the poison that you get from automobile exhausts) turned the neat and dignified Mimosa, or sensitive plant (left) into the dizzy specimen on the right. But the plant was all right again next morning.

ASTRONOMY

1936 Brings Important Eclipse

Astronomers Now Planning Journey to Siberia or Japan for Total Eclipse of the Sun in June

By JAMES STOKLEY

IN JANUARY most people make some sort of preliminary plans for their activities during the rest of the year, and astronomers are no exception. Just now some of them are making their preparations for a trip half way around the world, in June, to observe the first total eclipse of the sun since 1932 to be visible from an easily accessible part of the earth. In the summer of that year one was seen from Canada and New England. The following year there was another, of which the path crossed some small islands in the Pacific Ocean, and observations of it were made by a Japanese expedition. Though 1935 had the greatest number of eclipses ever visible in one year, none that occurred of the sun were total.

But on June 19, the tip of the moon's shadow will touch the earth in the Mediterranean Sea, about 250 miles south of Sicily, just as the sun is rising. Then the shadow, about a hundred miles in diameter, will sweep across Athens and some other parts of Greece, Turkey, the Black Sea, Siberia, including the cities of Omsk, Kainsk, Tomsk, Kansk, Bratsk and Khabarovsk; northern Japan, through Koito and Nemuro; then out into the Pacific Ocean. Just as it reaches the international date line, the meridian of 180 degrees longitude, the shadow leaves the earth, as the sun is setting. The beginning will be at 10:50 p. m., Eastern Standard Time, June 18, and the end at 1:50 a. m., which indicates the speed at which the shadow travels to cover so much territory.

Europe to See Partial

Only along the narrow strip crossed by the shadow will the dark disk of the moon totally obscure the sun, but a partial eclipse will be visible over a much larger area—practically all of Europe and Asia, northern Africa and Alaska, northern Canada and Greenland, as well as the north polar regions. But the partial eclipse is of little scientific value, so the astronomers will travel to points along the path of totality, particularly in central Siberia and Japan, where the corona, the sun's outermost layer, will appear for the longest time. At Bratsk the total phase will last 2 minutes and 32 seconds, while in Japan it will last 1 minute and 57 seconds, a little more than the New England Eclipse of 1932. Probably Japan will be the most popular observing point, because of its advantage in accessibility, but the extra time in Siberia will be a strong attraction. As the cities from which it will be seen are near the line of the Trans-Siberian Railroad, they can be reached by conventional means of transportation. Their latitude is about the same as that of England, so the chances of satisfactory weather are fairly good.

Three Others

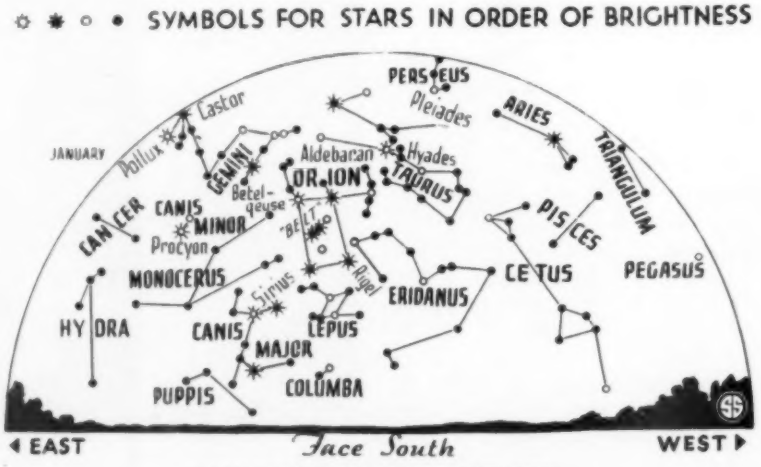
The other three eclipses of 1936 will not attract very much attention. On January 8, the moon will be eclipsed, when it enters the shadow of the earth, but this will not be visible from the United States. Practically the whole eastern hemisphere, and Alaska, will witness it, however. The total phase will start at 12:58 p. m., Eastern Standard Time, and end at 1:21 p. m., so it will be over before the moon rises in America. An eclipse of the sun always occurs when the moon is new, and eclipse of the moon itself when it is full, and the full moon always rises at sunset and sets at sunrise.

Another eclipse of the moon will be seen, over the south polar regions, most of the southern hemisphere, and parts of Europe and Asia, on July 4, but this will only be a partial one, as the moon will only advance about a quarter of its diameter into the earth's shadow.

The fourth eclipse will come on December 13, and will be annular. That is, the moon will then be farther away than its average distance, and its disk will not fully cover the sun. The ring of sunlight, which will remain visible, even when the eclipse is at its height, is called the annulus, hence the name for such an eclipse. This will be an interesting spectacle, but of little scientific interest, because even though most of the sun will be covered, the ring remaining will hide all the effects that make a total eclipse of interest. Along a path crossing Australia and New Zealand, including the city of Auckland, the annulus will appear. People over a larger area, including the southern part of the Philippine Commonwealth, will see the sun in partial eclipse.

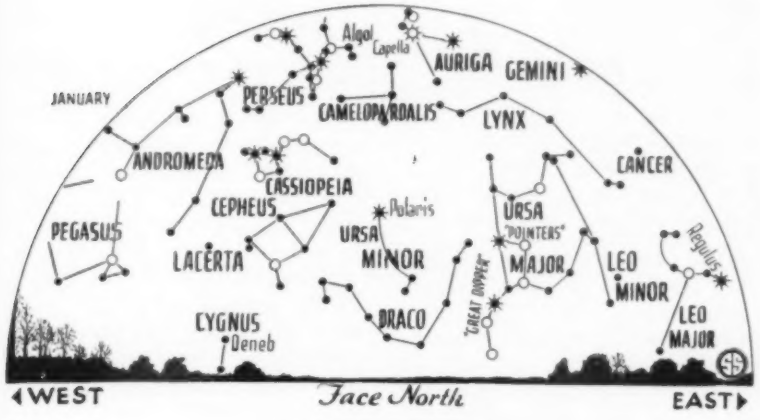
Sun Now Closest

Even though January is a cold month, the sun is now closest to the earth. On January 4 we will be in perihelion, which merely means "nearest the sun." At that time 91,312,000 miles will separate us. Aphelion, when we are farthest, will come on July 3, with the sun



BRIGHTEST STAR IN THE SKY

Sirius, the dog star, excels all others but the sun because it is very close to the earth. It may be seen in the southern sky below and to the left of Orion's familiar bright belt.



NO COMPETITION

The bright stars of winter shine this month without having their splendor dimmed by the light of the planets.

at a distance of 94,424,000 miles. At first glance, one might think that we should have warm weather when the sun is closest, but there are other factors that much more than compensate for this change. Because the earth's axis is inclined, at about 23 degrees, to the plane in which it revolves around the sun, the northern half of the earth leans away from it in winter and towards it in summer. This in turn affects the sun's height, as we all know it comes near to the zenith at noon in June, but now its noon-day height is less than a third of a right angle. Thus, its rays of heat are spread over a much larger area than when they fall directly downwards, and the heating effect is much less. In the southern hemisphere conditions are reversed, of course, for when the sun is low for us it is high for them. Consequently the people in Australia and South Africa are now enjoying mid-summer.

No Planets

The glorious stars of the winter sky shine in their full splendor this month, without competition from the planets, none of which can be seen during most of the evening hours. As soon as darkness falls, Mars and Saturn can be seen low in the southwest, but both are faint, and they set soon after the sun. On January 16, Mercury is at its greatest distance to the east of the sun, when it sets latest, then it may be glimpsed in the western twilight. Venus and Jupiter are close together in the constellation of the Scorpion, which rises about 4:30 a. m.

At ten o'clock on the first, nine on the fifteenth and eight on the thirty-first, the times for which the accompanying maps show the skies, Orion is the most conspicuous constellation, high in the south. It is easy to recognize because of the three stars in a row that form the belt of this heavenly warrior. The two stars north of the belt, Betelgeuse and Bellatrix, form his shoulders, while to the south are two others, Rigel, the brighter, the Saiph, the fainter, which mark his legs. A curved row of stars to the west of Bellatrix represents one of the giant's arms over which is thrown a lion skin, and the stars just above Betelgeuse are supposed to outline the other arm, in which he is brandishing a club. And well might he need this defense, for next to him, to the right, is Taurus, the bull, charging towards him.

Horns and All

The red star, Aldebaran, is the bull's eye, and the Hyades, the V-shaped group of which it is part, outline his face, while the two stars just above Orion are the tips of his horns, as shown on the old star maps. In the shoulders of the bull are the Pleiades, the "seven sisters" of mythology, though most people can only see six stars there with the naked eye.

The part of the sky in and near Orion contains more bright stars than in any other similar area, which is the reason that the evening skies of winter seem so much more brilliant than those of summer. Below and to the left of the warrior is the brightest star in the sky (except, of course, for the sun) Sirius, the dog star, part of Canis Major, the greater dog. This star is bright, not because of great instrinsic brilliance, but because it is very close. In fact, from northern countries no closer star can be seen, except with the aid of a telescope. But so far are even the nearest stars that the light of Sirius, travelling at the speed of eleven million miles a minute, takes more than eight years to reach the earth. Higher in the sky is the lesser dog, Canis Minor, with the star Procyon. Still higher, and almost due east, are the twins, Gemini, with Castor and Pollux. Capella, in Auriga, the charioteer, is in the zenith.

Standing on one corner in the west are the four stars called the "great square of Pegasus," though the uppermost, Alpheratz, is in the neighboring constellation of Andromeda. This, in turn, is next to Cassiopeia, seen in the north, and shaped like a letter W on one side. In the northeast is the great dipper, the handle hanging downwards. The uppermost pair of stars are the pointers, and a line from them to the left indicates the direction of Polaris, the pole star, close to the north pole of the sky, and always, therefore, appearing in about the same place. Polaris is at the end of the handle of the little dipper. If you follow the direction of the pointers in the other direction, you will come to Regulus, in Leo, the lion, seen at this time of evening rising in the northeast. Low in the northwest Deneb can be seen, all that now remains visible of Cygnus, the swan.

Science News Letter, December 28, 1935

ENGINEERING

New Radio Device Detects Leaks in Water Mains

OTHMAR W. Pies, valveman in the Water Department in Cincinnati, has perfected a device to detect leaks in water mains and pipes. As patented, his apparatus consists of a set-up of radio tubes with a very sensitive microphone pick-up which detects and locates the leaks. He connects his device with a fire hydrant, valve or ordinary house stop-cock having a direct connection with the main or house line.

A leak is disclosed by a sizzling sound which grows into a roar as the equipment nears the leak. By taking a reading on each side of the leak by use of a graph, he is able to find the exact location. He has seldom missed finding the leaking valve or pipe.

Science News Letter, December 28, 1935

ZOOLOGY

Immersed Beavers Can Stop Hearts and Hold Breath

BEAVERS held under water can apparently stop their heartbeats as well as hold their breath for considerable periods of time, experiments by Dr. Laurence Irving and M. D. Orr of the Uni-

versity of Toronto indicate. (*Science*, Dec. 13)

The two physiologists had a full-grown beaver, weighing forty pounds. They pushed the animal's head under water. Immediately the beaver relaxed and lay with its head on the bottom. It made no effort to escape for fully five minutes, but then struggled to come to the surface.

During its period of enforced immersion the experimenters felt carefully for its heartbeats. There were from six to ten normal beats at the start, but after that the observers could not detect any. When the beaver came up to breathe, its heartbeats became almost twice as rapid as they had been before its "ducking," although its breathing rate showed very little increase. The animal was paying off its "oxygen debt," accrued while it was under water. The experiment was repeated several times, always with the same results. There was no cruelty involved so far as the beaver was concerned, since like all aquatic air-breathing animals it is used to staying under water for fairly long periods.

The absence of any detectable heartbeat of course does not mean that the heart has stopped entirely, but that it has greatly slowed down. The hearts of hibernating ground-squirrels and similar small animals in their winter sleep show the same slowing down almost, but not quite, to the point of complete stop.

Science News Letter, December 28, 1935

PHYSICS

Artificial Radioactivity From 8 Elements Reported

TRANSMUTATION of the elements and artificial radioactivity by high energy atomic bombardment were reported to the meeting of the American Physical Society from the laboratories of the host institution, the University of California, Berkeley, Calif.

Eight different chemical elements, ranging from sodium and chlorine, found in common table salt, to rare platinum and deadly arsenic, give off piercing radiation like that from radium, according to papers presented by investigators working in the laboratory of Prof. E. O. Lawrence. Tool of accomplishment for the many researches was the giant 85-ton cyclotron magnetic accelerator apparatus, invented and developed by Prof. Lawrence.

The investigators not only have the immediate purpose of telling how atoms are put together but hold the hope of realizing some cheap yet effective substitute for costly radium in the treatment of cancer and its allied diseases.

Gamma radiation, the type of rays used in cancer hospitals, was reported by J. R. Richardson as being given off from sodium, chlorine and aluminum with energies as high as 3,400,000 volts.

Platinum became radioactive under deuteron bombardment, said Dr. J. M. Cork and Prof. Lawrence, and yielded radiation having energy of 4,500,000 volts. H. G. Paxton described experiments with radioactive phosphorus having a half life period of over 50 hours. Comparable experiments with zinc discussed by Dr. J. J. Livingood yielded artificial radioactivity having a half life of as much as 100 hours.

Most artificially radioactive elements retain their activity for only a few minutes at the most. The search, thinking of possible biological and medical applications, has been to find substances which would be active for longer periods. Radium, by comparison, has a half life of 1,600 years and, although costly, wears out, by disintegration, very slowly. The new reports on artificial activity lasting as long as five days are encouraging.

Science News Letter, December 28, 1935

GENERAL SCIENCE

Research Provides Defense Witness for Machinery

IN PLAYS, talkies, impassioned oratory and writings of all political hues, machinery is sometimes shown as a monster, forcing men out of jobs; and science, mother of machinery, shares her progeny's wicked reputation.

As defense witness for machinery, the National Industrial Conference Board presents a new study on machinery, employment and purchasing power. It combats the idea that the use of machinery in production leads to permanent displacement of labor and reduction of the total employment opportunities of our population. Says the study:

"During the period of its most rapid introduction, from 1879 to 1929, machinery has been responsible for the establishment of many new industries; it has created new opportunities for employment; it has released workers from industries producing goods to trade and service occupations; it has stabilized employment by increasing the proportion of the gainful population engaged in trade and service industries; it has made possible an enormous increase in the total volume of production by increasing the output per man; it has reduced hours of work and child labor. In general, the use of machinery has been the chief cause of the great improvement that has occurred in the purchasing power and the standard of living of the masses of the people.

"From 1929 to 1935 the general contraction in business activity was accompanied by an even more severe decline in the production of machinery and machine tools. The increase of the output per man which took place during the years of the depression was not so much due to the introduction of machinery and technological improvements as to the great efficiency of the working forces and drastic economies introduced by management all along the line of production and distribution. Unemployment during the business depression was not due to the fact that goods were being produced by machines instead of by men, but to the fact that goods were not being produced in sufficient volume. The answer to the problem of unemployment does not lie in placing restrictions on the use of machinery but in increasing the volume of production, which would increase the purchasing power of the people and lead to full re-employment."

Science News Letter, December 28, 1935

A census of the Soviet Union is planned for December, 1936.

RADIO

Tuesday, December 31, 1:30 p. m., E.S.T.
SCIENCE OF 1935—A review of this year's achievements and brief forecasts for 1936 by several scientists.

Tuesday, January 7, 4:30 p. m., E.S.T.
EXPLORING THE SEA — Commander Richard R. Lukens, U. S. Coast and Geodetic Survey.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.

PSYCHOLOGY

Studies Possible Motives Behind Curious Inscription

Leif Eriksson May Not Have Carved His Own Name On The Rock in Noman's Land, But Who Did Then?

WHO carved Leif Eriksson's name in runic letters and the date MI in Roman on a rock of lonely Noman's Land?

Not Leif Eriksson, anyway, is the view of Prof. E. B. Delabarre, professor emeritus of psychology at Brown University. (*Scientific Monthly*, November)

Prof. Delabarre has studied for many years the various inscriptions and pictures scrawled on New England rocks. He has listened to strange, eager theories: "Egyptian priests must have carved Dighton Rock." Egypt's wise men by a Massachusetts River! He has deliberated whether long-departed redskins or modern sunburned vacationists set their mark Indian fashion on boulders of some Maine beach.

The Leif Eriksson inscription came to light in 1926 on Noman's Land, small island south of Martha's Vineyard. Nine years is no long time for an argument over a petroglyph—a rock writing—to flourish. So the question of whether Leif the Viking actually left a signature in America, about five hundred years before Columbus, is nowhere near talked out.

Prof. Delabarre says:

"The writer's own opinion is that it was the work of some one within the present century. But other writers have expressed different beliefs. One attributes it to Leif himself or his Norse followers, and another to some later explorer of our coasts at some time within the sixteenth century."

Leif's name and date found on this rocky isle unfortunately does not seem to be an authentic record of Viking discovery. But, on the other hand, it does not seem to be a scientific hoax, or practical joke. So Prof. Delabarre concludes.

He finds that many people look at an ancient-appearing inscription and see only two possibilities. Either the thing is historic, important, and real, or it is a deliberate fake. That is too simple a way of disposing of motives, the psychologist declares.

Being a psychologist, Prof. Delabarre has set to work to analyze the motives that might have caused some unknown person, or persons, to write an inscription like this. He finds no less than 14 possible motives.

Number 1 is "desire on the part of an explorer to leave his signature, executed by himself or under his direction, as a record of first discovery."

Number 14 is "the urge to erect memorials to great events and heroes of the past."

Prof. Delabarre thinks it probable that motive 14 combined with motive 11—idle amusement—was responsible for the Eriksson inscription. Some one who genuinely admired the Viking hero wrote in an idle moment the name and date as a sort of private memorial, with no thought of deceiving any one. Scientific reasons for pinning the case to these motives Prof. Delabarre has announced in a separate report.

Science News Letter, December 28, 1935

PHOTOGRAPHY-ENGINEERING

Mural Portrays Error In Machine Shop Practice

ALTHOUGH no one has questioned the photographed beauty of the mural made by the Experimenters' Club of the DeWitt Clinton High School, New York City, and reproduced on the cover of the SCIENCE NEWS LETTER, November 9, 1935, readers have pointed out an error in machine shop practice when the tool holder was placed upside down.

Was it an experiment on the part of the Experimenters? Perhaps, but one suspects a practical joke on the part of someone who assumed that the members of the club were better photographers than machinists.

Science News Letter, December 28, 1935

A kangaroo may cover as much as 30 yards in a single leap.

3,500 LAMAS GREET AMERICANS

When the Cutting-Vernay American Museum Expedition visited Tibet's second city, Shigatse, they were greeted by a gathering of 3,500 lamas at a great lamasery. The party succeeded—after five years negotiations—in attaining its special aim of entering the sacred city of Lhasa to collect anthropological and botanical specimens. Mr. Suydam Cutting has returned with reports of scientific success and with fine photographic studies made by the expedition. The cover picture shows strolling players photographed in Lhasa. These men actors and dancers sometimes give performances lasting three days, the expedition found.

IN SCIENCE FIELDS

ARCHAEOLOGY

Same Old Human Nature—Greeks Drank at Games

WHEN university presidents worry about drinking at modern football games and other sport spectacles they are struggling with a problem that had ancient Greeks also losing sleep at nights. The Greeks had a law about it too, says Dr. Arthur P. McKinlay, Latin professor of the University of California.

A fifth century B. C. inscription near the stadium of Delphi can still be read, forbidding the carrying of wine into the stadium on penalty of a small fine—about 85 cents.

Drinkers 2,400 years ago, Prof. McKinlay explains, would try to outwit such a regulation by dedicating their liquor to the god of the games. The Delphi inscription, however, specifically forbade this subterfuge.

Science News Letter, December 28, 1935

CHEMISTRY

Enormous Pressures Used Now By Chemical Industry

HOW MAN has succeeded in producing synthetic nitrogen compounds and synthetic alcohols at low cost and in sufficient quantity to supply the world's needs was described at a meeting of the Franklin Institute by F. A. Wardenburg, general manager of the Ammonia Department, du Pont Company, Wilmington, Del.

High-pressure synthesis is the technique by which these results have been accomplished. Mr. Wardenburg said that pressures as high as 15,000 pounds a square inch are employed, such a pressure being equivalent to a column of water thirty times as high as the Empire State Building. At this pressure the gaseous raw materials used in the process have a density about one-third that of water, whereas ordinarily the same gases are much lighter than air.

Most of the high-pressure synthesis plants here and abroad are designed to "fix" atmospheric nitrogen in the form of ammonia, which in turn can be converted to nitric acid and nitrates, materials essential to peacetime industry and agriculture as well as to national defense. During the peak year of the World War, Mr. Wardenburg pointed out, when practically all of the explosives required by the Allies were made in America, no less than fifty ships were required to transport nitrate of soda from Chile to Atlantic ports. In the event of another similar emergency, the country would be entirely independent of Chile.

Of further significance is the fact that through the new high-pressure synthesis technique, cheaper nitrogen fertilizers have been made available throughout the world. Also, by a similar technique, gases can be combined to produce alcohols and other chemicals at a cost far below that achieved previously.

Science News Letter, December 28, 1935

PHYSICS

Scientists Find Mass of Unknown Atomic Particle

"DON'T count your chickens before they're hatched" is a good axiom for ordinary life, but by going contrary to the old adage scientists have just determined the mass of an atomic particle no one has ever found.

The particle, whose mass can be calculated but which has never been detected despite rigid scientific search, is called the neutrino; first named by the famous Italian physicist Prof. Enrico Fermi, who is a pioneer in transmutation of the elements by artificial means.

The neutrino is thought to be like a little neutron in having no electric charge, but its mass is only six hundred-thousandths as great. And neutrons run more than a thousand billion billions to the gram. And a gram is one-thirtieth of an ounce.

As determined in transmutation experiments reported to the meeting of the American Physical Society by Prof. C. C. Lauritsen and his colleagues, Drs. T. W. Bonner, L. A. Delsasso and W. A. Fowler of California Institute of Technology, the mass of neutrino would be equal in grams to a decimal point, then 29 zeros and finally a six—thus: .000,000,000,000,000,000,000,000,000,006 grams.

Science News Letter, December 28, 1935

ENGINEERING

Boulder Dam Has Already Prevented One Flood

BOULDER dam, completed during 1935, has already prevented one menacing flood in the Imperial Valley of California, it was revealed in the annual report of the Secretary of the Interior.

Shortly after the gates of the dam were closed, says the report, a flood level flow of 15,000 cubic feet per second of water raged in the Colorado above the dam. Had this water passed on, the Imperial Valley would have been menaced.

Instead, the waters began filling up the 115 mile long lake and reservoir above the dam, which has already been set aside as a bird refuge and stocked with game fish.

Boulder Dam will make impossible a repetition of the 1934 disastrous drought in the Imperial Valley which cost the region over $10,000,000, adds the report.

Science News Letter, December 28, 1935

PHYSIOLOGY

Parasitic Worms Killed By Serum in the Blood

BLOOD serum contains some unknown substance that can kill the larvae of certain disease-causing parasitic worms, it is indicated in experiments reported (*Science*, *Nov.* 29) by Dr. James T. Culbertson of the College of Physicians and Surgeons, Columbia University, and Dr. S. Benton Talbot of Davis and Elkins College.

Drs. Culbertson and Talbot tested the sera of bloods ranging from human down to catfish on several species of the parasites. Cat blood showed no ability to kill any of them, but all other bloods proved lethal to one or more species of the worms.

It has long been known that blood serum can kill bacteria and other one-celled organisms; but so far as is known its action on many-celled creatures had never been investigated.

Science News Letter, December 28, 1935

ASTRONOMY

Costly Grinding of Telescope Disk Replaced by New Method

By Depositing Aluminum Just Where It is Wanted Surface Can Be Shaped in Any Desired Manner

FIVE years of time and tens of thousands of dollars are still to be spent in grinding the great 200-inch disk of glass, eventually to be the mirror of California Institute of Technology's giant telescope. But this may be the last time astronomers will ever have to go through such a tedious, intricate and costly procedure.

Dr. John Strong of the California Institute of Technology, inventor of the aluminum coatings for telescope mirrors to replace the more usual silver films, reported to the American Physical Society experiments on controlled deposition of the aluminum surface to form the parabolic concavity desired for astronomical telescope mirrors.

The evaporation deposition of aluminum technique of Dr. Strong and Dr. E. Gaviola (See *SNL*, July 6) starts with a spherical mirror. Aluminum is evaporated on to the mirror surface with a series of concentric zone screens in place. When sufficient metal has been applied to the exposed areas a screen is removed and more metal applied. Working in this fashion the whole surface of the spherical mirror is coated with aluminum having different thicknesses. Eventually the spherical surface becomes a paraboloid.

The years of grinding to be performed on the great 200-inch disk of the Caltech telescope will be spent in achieving the same parabolic form of surface.

Reporting definite accomplishments, Dr. Strong told of a 12-inch diameter spherical mirror which has been turned into a parabolic mirror on repeated occasions. The finished surface, he pointed out, was accurate to one-twentieth of a wavelength of light. Theoretically a mirror surface may be defective to one quarter of a wavelength of light and yet be usable, so that Dr. Strong's accuracy yields what might be called an optical "factor of safety" of some five times.

Physicists were equally glad to hear of another test in which a spherical mirror more than five inches in diameter was parabolized with its optical axis outside the edge of the mirror. Such mirrors are in demand for use in spectrographs.

Also successfully accomplished was the correcting of a defective parabolic mirror by putting the aluminum coating on in the right places.

Science News Letter, December 28, 1935

MEDICINE

Poison May be Factor in Causing Pernicious Anemia

WHILE liver extract has conquered pernicious anemia as a fatal disease, new research by Drs. G. E. Wakerlin and H. D. Bruner, of the University of Louisville School of Medicine, may hold the promise of improved understanding of its cause.

Drs. Wakerlin and Bruner believe that the old idea of a poison factor in the disease's cause may have been right. They give research findings (*Science*, Nov. 22) that "throw doubt on the current deficiency theory as a complete explanation of the pathogenesis of pernicious anemia."

Kidney excretions from pernicious anemia patients before treatment contain two substances, they report. One of these substances poisons pigeons; but before it poisons them it produces a dangerous decrease in the reticulocytes or young red cells of their blood. The other substance is relatively non-poisonous and stimulates the production of these young red cells. The excretions from normal persons and from pernicious anemia patients after treatment with liver extract do not contain the poisonous substance.

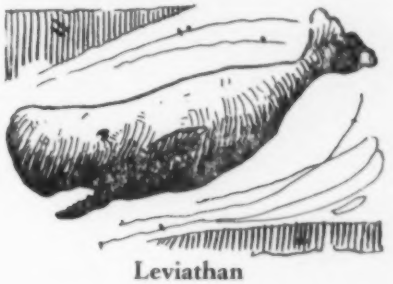
From this Drs. Wakerlin and Bruner conclude that the old idea of a poison being the cause of pernicious anemia may be correct. The poison, they believe, cuts down the production of red blood cells by its action on bone marrow.

If this theory is correct, they suggest that it may be possible to obtain enough of the poison to produce pernicious anemia in animals like the dog for further study of the disease and its cause.

Science News Letter, December 28, 1935

ZOOLOGY

NATURE RAMBLINGS
by Frank Thone



Leviathan

"CANST thou draw out Leviathan with an hook, or his tongue with a cord which thou lettest down?

"He beholdeth all high things; he is a king over all the children of pride."

If one takes "children of pride" to signify all animals, the whale might well be hailed as king, for the larger modern whales are bigger than any other animal on the land or in the sea, living or extinct. The long-dead brontosaurs were the nearest approaches ever made to whales in point of size, and they did not reach even half his total displacement, though by grace of interminable necks and tails they did rival him in length.

But other verses of that famous forty-first chapter of Job have been set at nought by the technical advances of modern whaling. No longer can it be said, "He esteemeth iron as straw, and brass as rotten wood . . . Darts are counted as stubble: he laugheth at the shaking of a spear." The darts that now pursue poor Leviathan are hurled from the muzzles of cannon: a fair hit means a dead whale every time.

So serious has the situation become, with the depletion of the northern whaleries and the harrying of the persecuted monsters in their last refuge around Antarctica, that international cooperation is being enlisted in an effort to restrict the yearly kill to a point where the natural increase will replace it. Unless this is done, the largest animals that have ever lived will have to take their place with the dinosaurs in the limbo of things that have been.

Science News Letter, December 28, 1935

Clam chowder, succotash, clam cakes, and corn meal pudding are among the recipes that early colonists borrowed from the Indians.

•First Glances at New Books

Psychology

THE VECTORS OF MIND—L. L. Thurstone—*Univ. of Chicago Press*, 266 p., $4. An exposition of the author's theory of multiple-factor analysis with a preliminary section devoted to a "mathematical introduction." A basic work of particular interest to those interested in psychological testing and personality research.

Science News Letter, December 28, 1935

Geography

COSTA RICA AND CIVILIZATION IN THE CARIBBEAN — Chester L. Jones — *Univ. of Wisconsin*, 175 p., $1.50. "Unfortunately, few Americans give real study to the affairs of our closest neighbors, and still fewer visit the Caribbean republics with serious purpose," writes Prof. Jones. In this monograph he describes the economic and social development and the current problems of one of these highly individual Caribbean states.

Science News Letter, December 28, 1935

Engineering-Economics

DEVELOPING AMERICA'S WATERWAYS —Marshall E. Dimock—*Univ. of Chicago Press*, 123 p., $1.50. An account of the newer development of inland waterways, especially since the War, as well as a careful examination of this development from the points of view of economic justification and efficiency in management.

Science News Letter, December 28, 1935

Vocational Guidance

CAREERS AHEAD—Joseph Cottler and Harold Brecht—*Little, Brown*, 312 p., $1.25. Entertainingly written in narrative style to give youngsters of high-school age, or earlier, information about possible future occupations. Science is dismissed with a chapter on "The Chemist and the Druggist," one on "The Dentist," and another on "The Medical Profession."

Science News Letter, December 28, 1935

Veterinary Physiology

THE PHYSIOLOGY OF DOMESTIC ANIMALS—H. H. Dukes—*Comstock*, 643 p., $6. Third edition of a textbook that has been very useful to students of veterinary medicine, and to animal physiologists generally. The first two editions appeared in lithoprinted form; their success has warranted the publication of the book in conventional format, printed from type.

Science News Letter, December 28, 1935

Biography

AUTOBIOGRAPHY—Sigmund Freud—*Norton*, 153 p., $2. A new edition containing a postscript which brings it up to the present day. The work is translated by James Strachey. It is not in the nature of a psychoanalytic history of Freud, but more a Freudian history of psychoanalysis.

Science News Letter, December 28, 1935

Bibliography

MATERIAL OBTAINED FREE OR AT SMALL COST, gathered by the students in advanced reference in the Division of Library Instruction, University of Minnesota—*Alumni Association, Univ. of Minn., Minneapolis*, 50 mimeographed leaves, 50c. Second edition of a list of pamphlet material which should be very useful to teachers and librarians. It is arranged by subject, and the material covered is so diversified that the list should aid a surprisingly large number of people.

Science News Letter, December 28, 1935

Archaeology

COINS FROM SELEUCIA ON THE TIGRIS —Robert H. McDowell — *Univ. of Michigan Press*, 248 p., 7 plates, $3.50. Catalogs and discusses coins of Seleucid and Parthian eras found in caches on the site of Seleucia, in recent excavations. The coins include a number of new types, and study of them has shed light on a number of points of economic and political history. The site has yielded more than 30,000 coins.

Science News Letter, December 28, 1935

Psychology

STUDENT'S GUIDE FOR BEGINNING THE STUDY OF PSYCHOLOGY — W. L. Valentine, J. H. Taylor, K. H. Baker, and F. N. Stanton—*Prentice-Hall, Inc.*, 267 p., $2.35. A successor of the laboratory manual which has become more than that. This well illustrated guide follows the organization of Dockeray's General Psychology and Valentine's Readings in Experimental Psychology. It is interesting alone, and should be a great aid in making the first year of psychology a fascinating study. A spiral binding adds to its convenience.

Science News Letter, December 28, 1935

Psychology

GROWTH, A STUDY OF JOHNNY AND JIMMY—Myrtle B. McGraw—*Appleton-Century*, 330 p., $3.50. The complete report of a famous experiment in which one twin was given special training during early infancy while the other was given no special attention. The author draws conclusions regarding the value of early training, and the patterns followed by the developing human organism.

Science News Letter, December 28, 1935

Medicine

PHYSICIANS' AND SURGEONS' TEXTBOOK ON ENDOCRINOLOGY AND READY REFERENCE THERAPY—Theodore Larson—*Wetzel Publishing Co.*, 870 p., $10.

Science News Letter, December 28, 1935

Psychology

CRITERIA FOR THE LIFE HISTORY—John Dollard—*Yale Univ. Press*, 288 p., $2.50. Here is an attempt to standardize and make more scientific a very useful tool of research heretofore lamentably lacking in precision. The criteria are applied to six life-history documents from Freud, Taft, Adler, Shaw, Thomas, Znaniecki, and H. G. Wells.

Science News Letter, December 28, 1935

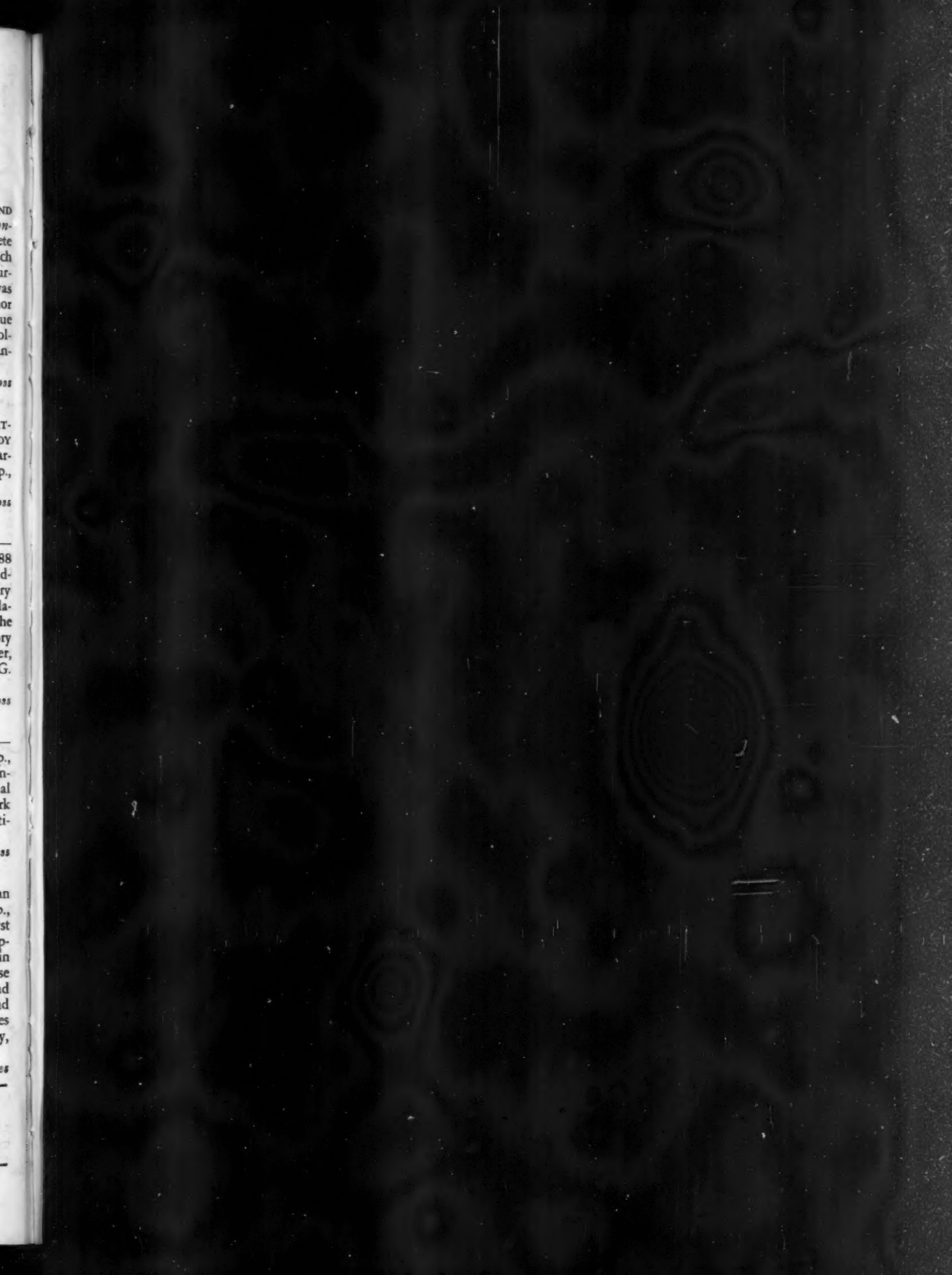
Psychology

A BRIEFER GENERAL PSYCHOLOGY—Gardner Murphy—*Harper*, 572 p., $2.50. A new textbook, briefer, and containing less technical and controversial matter than the author's previous work on "General Psychology." It is bountifully illustrated.

Science News Letter, December 28, 1935

General Reference

MORE FIRST FACTS—Joseph Nathan Kane— *H. W. Wilson Co.*, 599 p., $2.75. Supplementing "Famous First Facts," giving a record of the first happenings, discoveries and inventions in the United States, this book is of course particularly valuable in libraries and schools. It is sufficiently interesting and useful to appeal to anyone who wishes to build up a small reference library, however.

Science News Letter, December 28, 1935

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